


2008 年中央研究院「年輕學者研究著作獎」得獎人簡介

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得獎著作名稱：(請以申請時之格式填入)

Deneckere, R. and M. Liang (2006), "Bargaining with Interdependent Values," *Econometrica*, 74(5), 1309-1364.

Deneckere, R. and M. Liang (2008), "Imperfect Durability and the Coase Conjecture," *The Rand Journal of Economics*, 39(1), 1-19.

得獎著作簡介：(2000 字左右)

傳統上經濟學家普遍認為，被獨家廠商壟斷的市場或是要透過一對一談判議價的買賣，將無法達到整體社會最適效率的交易量與成交速度。

然而，諾貝爾經濟學獎得主寇斯教授，在 1972 年於著名的法律經濟學期刊發表了【寇斯猜測】來挑戰這個直觀，他認為販售完全耐久財的獨占廠商，若無法向消費者保證未來不會降價，則必須與未來的自己競逐今天的消費者，因此並不像非耐久財獨占廠商般，可以享有壟斷市場後的訂價優勢。當廠商調降價的技術成本趨於零時，即使是獨家專賣，市場也會運作地像同時存有多家廠商在競爭消費者一般，達到社會最適的交易量。而同樣的道理，也被應用到單邊訊息不對稱下的一對一談判模型中，得到一個極具爭議的結論，也就是即使在出價的一方對交易所能創造出的利潤多寡並不確定下，也不會造成合則兩利的談判卻曠日費時，無法立刻完成交易。

我們這兩篇著作的主要貢獻是解釋【寇斯猜測】所提出的擁有出價優勢者，在存有現在與未來的自己互相競爭的環境中，如何因為擁有這訂價優勢，在多數自由市場下運作時，反而成了扭曲資源配置效率的力量，因此成功地澄清後續文獻在上述這兩個領域所衍生的理論分析與實證直觀無法配合的混沌。

我們第一篇論文討論不完全資訊下的理性協商或訂價，主要有兩大應用：一、是用於分析存在單邊訊息不對稱下、一對一的互惠談判協商，如勞資糾紛、法庭外和解、資源開採議價等等問題；另一、是分析完全耐久財獨占市場中，若廠商生產成本隨著累進總生產量增加而遞減時，獨占專賣的市場結構是否會造成

社會整體福利損失。

在一對一的談判文獻上，我們的論文是第一篇成功地證明出，資訊不完備是產生無效率談判的原因，這個直觀。我們將引起爭議的【寇斯猜測】成立的前提，精確地刻劃出來：若無出價權利的一方所握有的資訊不會影響到出價方的交易底價，或是即使有影響，也只會影響出價方要賺多賺少的利益分配時，如【寇斯猜測】所描述的現在與未來自己競爭的力量，就會讓此互惠交易立即達成，無任何社會福利損失；若非出價方的資訊嚴重影響到出價方的底價，資訊就成了出價方考慮交易盈虧的關鍵，那【寇斯猜測】所提出的現在與未來自己競爭的力量，反而會讓出價方必須利用時間成本，來推測對方的資訊，以避免高估了交易所能創造的價值，因此，寇斯教授所提到的這個競爭力量，反而釀成更長的技术性拖延協商，產生更大的社會福利損失。

這篇文章不但將過去這支文獻的證明方法，成功地推廣到更一般的環境中，亦提出許多創新的分析技術。我們先依傳統文獻設計，由不具內部資訊的一方出價，讓具內部資訊的一方只有同意與不同意這兩種選擇，以確保應用【循續均衡】去求解時，可以得到一個唯一的結論，接著我們再放寬非出價方的內部資訊不影響出價方底價這個假設，以使該資訊可以成為影響出價方盈虧的關鍵。

在 1986 年最原始的模型中，資訊不影響出價方的底價，因此，解的存在證明，並不需將其結構精確地刻劃出來，我們特地指出後續文獻的錯誤，當資訊成了出價方盈虧的關鍵時，若依樣畫葫蘆般地證明，解在建構中途過程就無法保證不會崩潰。因此必需先要將解精確地刻劃，存在證明才有可能得到。

除了證明此模型下【循續均衡】解的存在、具備唯一性，並導出【寇斯猜測】成立與否的關鍵條件之外，理論分析中最大的突破，是證明這些解會隨著更新議價時間縮短為零，收斂到一個只跟模型中少數幾個相關參數有關的線型函數，並將談判過程可能產生長期停滯的時間長度與位置點的公式推導出來。整個推導數學雖然繁複，基本上是善用兩個關鍵經濟力量去建構。也就是具內部資訊方的談判時間成本，會隨著掌握到的不同內部資訊而有不同的特質，再加上【寇斯猜測】所描述的經濟力量，會讓出價方只要期望利潤為正就無法拖延談判時間，因此，在更新議價時間趨近於零時，會有個精簡的公式存在。因完整地刻劃出收斂解的公式，不完全資訊所造成的額外社會福利損失，也就可很方便地計算出來。

第二篇論文討論【不完全耐久財】的獨占市場是否會造成社會福利損失的問題。大部份的產品都屬於【不完全耐久財】，因此，這是個在產業組織中很重要的課題，卻因為模型較兩種極端產品：【完全耐久財】與【非耐久財】要複雜太多，而理論文獻中又得到只要產品存有一些耐久性，【寇斯猜測】所提出的現在與未來自己競爭以達到市場效率的結果就能成立。這個不符合大家直覺的結論，也影響到對此市場的相關研究投入。

這篇文章是第一篇將此模型的所有【恆定均衡解】嚴謹地找出來，所得結果成功地解釋了在【非耐久財】的獨占市場中，必然產生的社會資源無效率使用，是如何隨著產品的持久性增加，過渡到【完全耐久財】獨占市場因與未來競爭而

具效率的結果。其中，最主要的關鍵在於產品的耐久性有多長，若是極易損壞，那些因產品損壞而需重新購置的需求量，就足以讓廠商訂價永遠維持在高檔，因此就不會有動機降價來增加銷售量，所以也就不需要如寇斯教授所提出的要和未來的自己競爭今天的消費者，如此，當然也就得不到與未來競爭帶來的效率結果。

除了澄清舊文獻中，因為只找到這模型的部分解，而產生對此市場銷售運作的一些盲點與偏離直覺的結論外。經由完整的分析，我們亦導出既有文獻中未曾發現的兩個因為市場獨占結構，而影響經濟活動資源配置的扭曲力量：一、【不完全耐久財】的獨占市場，不但不保證會如【完全耐久財】一般，無社會福利損失，廠商反而有可能會因為要避免【寇斯猜測】的競爭力量，取信消費者未來絕不降價，而把價格訂得比【非耐久財】的獨占市場更高，反而產生更多的社會福利損失。二、為了維持產品高價時的重置需求量夠大以避免【寇斯猜測】的競爭力量，廠商會有動機故意縮短產品使用壽命，因此，在原本獨占市場常發生的非社會最適產量售價上的扭曲外，又多了一個非社會最適產品使用壽命的扭曲，造成社會福利雙重損失。

評審簡評：

梁小姐的主要學術貢獻在於對談判模型的深入研究。她長達 55 頁的論文“Bargaining with Independent Values”基本上完全刻劃（completely characterize）了單邊訊息不對稱（asymmetric information）下，無限期（infinite horizon）談判的所有均衡結果。論文中處處顯示作者對所處理問題數學結構的深入了解及論證的巧思。這是一個在賽局理論裡，相當基礎而重要的貢獻，也將影響這個領域日後的研究走向。自然的，它刊登於經濟領域裡最重要的數理期刊 *Econometrica*。另一篇論文“Imperfect Durability and the Coase Conjecture”也同樣的完全刻劃一個無限期的耐久商品獨占廠商的定價策略。和上一篇論文一樣的，這個基礎性的貢獻也是所屬研究領域的重要文獻。

兩篇論文同為所屬領域的重要論文。梁小姐毫無疑問為近年台灣經濟學界最優秀的年輕學者之一。

2008 Academia Sinica Research Award for Junior Research Investigators

<p>Name : Meng-Yu Liang</p> 	<p>Education:</p> <p>B.S., Mathematics, National Taiwan University, 1987-1991.</p> <p>M.A., Economics, National Tsing-Hua University, 1991-1993.</p> <p>M. S., Economics, University of Wisconsin-Madison, 1994-1996</p> <p>Ph.D., Economics, University of Wisconsin-Madison, 1996-1999.</p> <p>Employer(s)/Job Title(s):</p> <p>Academia Sinica, Institute of Economics, Assistant Research Fellow 2005-</p> <p>University of Western Ontario (Canada), Assistant Professor 1999-2005</p>
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Award publications

1. Deneckere, R. and M. Liang (2006), "Bargaining with Interdependent Values," *Econometrica*, 74(5), 1309-1364.
2. Deneckere, R. and M. Liang (2008), "Imperfect Durability and the Coase Conjecture," *The Rand Journal of Economics*, 2008, 39(1), 1-19.

Summary of the Award publications (around 2000 words) :

Traditionally, economists have believed that inefficiencies arise whenever markets are served by monopolies, or whenever parties in an economic transaction must negotiate an agreement.

In his seminal contribution, "Durability and Monopoly" (1972), Nobel prize laureate Ronald Coase challenged these beliefs, and forcefully argued that in each of these situations, market forces left to their own device can produce economically efficient outcomes, provided certain natural conditions hold. More specifically, Coase argued that if the monopoly is for a perfectly durable good, then the product must sell at the perfectly competitive price, provided the seller can revise his prices frequently. Equally, if one of the parties involved in a bargaining situation can revise her proposals quickly, then an efficient agreement will be reached.

Our two papers develop and analyze rigorous theoretical models to evaluate the scope of validity of Coase's arguments. In the case of durable goods monopoly, we

show that when the durability of the product is low enough, the seller necessarily sells at the monopoly price. In the case of bargaining, we demonstrate that if one party has superior information about the benefits of the transaction to both parties, and if those benefits are sufficiently interrelated, then the process of bargaining itself necessarily produces inefficiencies.

The first paper, "Bargaining with Interdependent Values," sets out to explain why rational parties have such a difficult time reaching mutually beneficial agreements. Even a casual glance at the evidence shows that bargaining inefficiencies abound. These inefficiencies take on many forms: failure to reach agreement when gains of trade exist (e.g., lawsuits that go to trial), delays in reaching agreement (e.g., labor disputes such as strikes or work slowdowns), the build-up of significant expenses in brokering an agreement (e.g., lawyer fees), and settling on contractual terms that fail to fully realize all gains from trade. Ever since Hicks (1932), economists have wondered why the bargaining parties do not simply avoid such inefficiencies by settling immediately at the terms they expect eventually to arrive at.

The first major breakthrough in the profession's understanding for why inefficiencies in bargaining could occur stems from the economics of information. When some or all of the bargaining parties have private information about some aspect critical to reaching agreement, bargaining delay might act as a device by which those parties can credibly convey the relative strengths of their bargaining positions.

Whether such bargaining delays necessarily occur is studied by the literature on the Coase Conjecture. This literature considers the simplest asymmetric information bargaining problem, in which a seller with known cost makes repeated price offers for the sale of an indivisible asset to a buyer whose valuation for the asset is private information. According to the Coase Conjecture, if the gains from trade are bounded away from zero, then the game in which the seller makes all the offers has a unique sequential equilibrium outcome. In this outcome, the seller's introductory offer converges to her cost (or the lowest possible buyer valuation, whichever is higher) as the length of the time period between successive seller offers vanishes. Thus in this environment, free-style bargaining imposes no limitations on the efficiency of the outcome, provided "bargaining frictions" are vanishingly small.

However, Coase's predictions have only been proven to apply to situations in which one party has private information about his own valuation of the transaction. This environment is very special, as the static incentive compatibility and individual rationality constraints then do not restrict the efficiency of trading mechanisms. Attempts to generalize the analysis to environments in which ex-post inefficiency necessarily arises in any trading mechanism have thus far been hampered by severe technical difficulties (in the form of a severe multiplicity of sequential equilibrium

outcomes, and the corresponding need to appeal to equilibrium selection arguments). We circumvent these problems by specifying a model in which one party (the seller) has private information about the benefits of the transaction to both parties. This environment is sufficiently rich to permit situations in which the first best outcome is unattainable. At the same time, it embeds the traditional Coase Conjecture environment as a special case, and shares with it the desirable property that there (generically) is a unique sequential equilibrium outcome.

Our investigation is of interest because many real world bargaining problems involve interdependencies in valuations. For example, in lawsuits involving the health hazards of a manufacturer's product, or the environmental consequence of a production method, the manufacturer may have private information regarding the safety of his product or the risks associated with his production method that is relevant to the welfare of potential victims.

We provide a complete characterization of the limiting equilibrium outcome of this infinite horizon bargaining game, as the length of the time period between successive offers becomes small. We show that contrary to the case of independent valuations, the limiting outcome is often not second-best efficient. Specifically, whenever the interdependency in valuations is sufficiently strong that the expected valuation of the uninformed buyer falls short of the highest possible seller valuation, the limiting outcome necessarily involves excessive delay. In this case there exist trading mechanisms other than repeated bargaining that achieve higher expected gains from trade. In other words, bargaining is then an inefficient way in which to structure transactions.

Our characterization of the bargaining outcome also has interesting empirical implications: when the informed party can make frequent offers, there are recurring bursts of high probability of agreement, followed by long periods of delay in which the probability of agreement is negligible. We also pin down both the length of these bargaining impasses and the timing of the breakthroughs.

The second paper investigates how the durability of a product offered for sale affects a seller's ability to exercise monopoly power. For the case of a perfectly durable good, Coase (1972) has demonstrated that a monopolist must sell his product at the perfectly competitive price level. Coase's logic is that a durable goods monopolist faces an irresistible temptation to keep on cutting her price in order to further penetrate the market. Unless there is a limitation on the rate at which the good can be produced, the competitive outcome will be achieved "in the twinkling of an eye" (Coase, 1972). Subsequent authors have argued that Coase's reasoning extends to products of limited durability, even when that durability is arbitrarily low, by constructing an equilibrium that has the same qualitative properties when prices can

be revised sufficiently frequently.

Coase's prediction presents somewhat of an empirical puzzle, as there does not seem to be any systematic evidence that durable goods monopolists make less profits, or price at lower margins, than their nondurable counterparts. For example, two of the most profitable monopolies in the US, Microsoft in the market for software, and Intel in the market for microprocessors, sell durable goods. Their prices also appear far above the marginal cost of production (which is near zero for software). Furthermore, the theoretical prediction that the monopoly outcome obtains whenever the good is non-durable, yet the competitive outcome results whenever the good is durable, no matter how quickly it depreciates, seems unappealing.

Our second paper studies an infinite horizon discrete-time game of price setting by a monopolist selling a good of finite durability. We establish that when the depreciation factor is sufficiently high, a Coase Conjecture equilibrium never exists. More strikingly, above a certain threshold for the depreciation factor, there is a unique stationary equilibrium, in which the monopolist charges the monopoly price in every period. Thus, when the product is of sufficiently low durability, the monopoly outcome necessarily obtains. The intuition for this result runs as follows. Coase's logic is that with infinitely durable goods, the monopolist is always tempted to sell additional output until every consumer has been served. However, when the product depreciates, old customers who value the good considerably above average reenter the market whenever the product fails. When the depreciation factor is sufficiently high, selling at a relatively high price to replacement demand is more profitable than lowering the price in an effort to further penetrate the market. This equilibrium continues to exist when the time period between successive price revisions is allowed to become arbitrarily small.

When the good is of sufficiently high durability, we establish that the Coase Conjecture equilibrium is the unique equilibrium of our model. This threshold level of durability is decreasing in the time period between successive price revisions, and approaches zero as the latter vanishes. However, in this case we show that the manufacturer has an incentive to reduce the durability of the product to a level sufficiently low to destroy the Coase equilibrium. Thus, our model can potentially explain the empirical puzzle described above: Either the inherent durability of the product is low enough that the manufacturer can fully exercise his market power, or else the manufacturer can restore his margins and profitability through planned obsolescence.

From a theoretical perspective, our paper contributes by developing a novel method for constructing stationary equilibria of the discrete-time game. Using this construction, we are able to completely characterize the set of stationary equilibria for

the special case where consumers' valuations take on only two possible values. We show that, depending upon the parameters, three types of stationary equilibria can exist: a Coase Conjecture equilibrium, a monopoly equilibrium, and a "reputational" equilibrium. The Coase Conjecture equilibrium exists for sufficiently low values of the depreciation factor, and is characterized by a decreasing price path, and a unique steady state equal to the competitive quantity. The monopoly equilibrium exists for sufficiently high values of the depreciation factor, and has the seller charging the static monopoly price in every period. For intermediate values of the depreciation factor, all three equilibrium types coexist. In the reputational equilibrium, the steady state quantity falls below the monopoly quantity. Were the monopolist to increase sales beyond this level, equilibrium play would revert to the Coase Conjecture equilibrium. An important message therefore emerges from our analysis: in markets for durable goods monopoly power may result in higher margins and larger welfare losses than in markets for perishable goods.

For general "neoclassical" demand functions, our method for constructing stationary equilibria still works, but a complete characterization of the set of stationary equilibria as a function of the parameters becomes unwieldy. Nevertheless, we are able to provide an existence result, and show that the qualitative properties of the two-step demand case generalize to this class.